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Can fishing tourism improve sustainability of fishing chain?

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Summary

One environmental event verified during the last years in the Mediterranean sea is that the presence of tropical fishes is causing death of the original fauna. This has attracted the attention of not only the fishermen, but also that of the European Community and all of the associations (public and private) which work to preserve the environment.

There are several initiatives to preserve the environment, and the “*fermo biologico*” is one of these. It tries to solve the Mediterranean fish’s depopulation problem, restricting the fishing in some period of the year.

As known, the management of the biological resources is addressed to guarantee the environmental sustainability. This sustainability can be guaranteed by those who work in the fish sector, through new leisure activities, able to answer the increasing touristic demand.

The objective of this study has been that to investigate whether leisure activity like fishing tourism can preserve the Mediterranean ecosystem and at the same time guarantee an additional income to the fishermen. This income could possibly balance for the obligation days stop, imposed them by the biological stop measure.

The study has been conducted in the summer 2009 and has involved fishermen that practise fishing tourism in the Southern part of Sardinia.

KEYWORDS: Fishing tourism, Sustainability, Customer satisfaction

1. Introduction

The Mediterranean sea is one of the most popular tourist destinations in the world. Every year an increasing number of people choose this area as the place to spend their holiday. Known in the world for its clean blue water and biodiversity, the Mediterranean sea can be defined as a semi-closed sea with a narrow connection with the Atlantic Ocean through the Strait of Gibraltar.

During the last years, tourism has become the main source of income for people that live in the Mediterranean countries and nowadays fishing tourism represents one of the most popular forms of outdoor recreation in this area. The Mediterranean sea, like any other ecosystem, is highly

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sensitive to any external input, whether it comes from human activity or natural events like climatic change. The objective of this study is to investigate whether leisure activity like fishing tourism can sustain the fish chain, improving the income of the anglers and at the same time preserving the Mediterranean ecosystem. To get a better understanding of this, an empirical study was conducted in Sardinia.

As known, Sardinia is an island located in the middle of the Mediterranean area and it is famous in the world for its beautiful beaches and natural parks. These two elements contribute to attract a large number of tourists coming from all over the world each year. Thanks to the collaboration with two firms that practise fishing tourism in the Southern part of Sardinia, it has been possible apply a model of customer satisfaction analysis to a group of tourists that, in the summer 2009, partook at this kind of tourism recreation. According to Goodwin (1996) that defines ecotourism as low impact nature tourism that contributes to species or habitat maintenance either directly through a contribution to conservation and/or indirectly by providing revenue to the local community sufficient for local people to value, and therefore protect, their wildlife heritage as a source of income, we can think about the tourism fishing as part of the ecotourism.

2. Fishing tourism as outdoor recreation

On the base of the Italian law² n.165 (10th February 1992), the fishing tourism can be practised each year from the first of May until the thirtieth of September. Fishing tourism is, normally, a daytrip in a fishing boat with a local fisherman that takes tourists on board. The tourists take part in the operation by pulling the nets and performing other tasks, coming in touch with the normal life of the fisherman and his equipage.

A typical trip on board of this boat starts in the morning, leaving the port around 9 or 10 o'clock and finishes in the evening at 7 o'clock, and as established by the law, departure and arrival are in the same port.

The services offered to the tourists, by those who practise this kind of tourism recreation, are more or less the same. They can be different in terms of place visited or dishes served for lunch and again trip price.

The dishes served, are prepared using the fish catch of the day, while the place chosen for the trip depends on where the fisherman has obtained his license fishing. According to the law, fishing tourism can only be practised in their own sea affiliation department and not over 3 sea miles from the coast.

Other leisure activities that are usually included in the fishing tourism trip, are swimming and visits in a natural heritage or a characteristic village.

² Modified by the D.M. n. 293 of the 13th April 1999.

Both of the fishing boats which took part in the research operate in the Southern part of Sardinia. The landscape that tourists can admire during the trip is a bit different between the two boats, whereas all the other elements are the same. In detail, the trip is organized in the following way: the boat leaves the port at 9 o'clock in the morning and the first activity is to pull the net. During this activity the fisherman involves the tourists explaining them what is happening, describing the different fishes in the catch, and showing the ecosystem that characterizes the fishing sea zone. After that, the round carry on achieving natural areas that are not easy to reach alone. Here, they do some stops and the tourists can swim and scuba dive. Then, one more stop takes them in *Capo Malfitano* or *Carloforte*; this depends on which trip they are taking. People who book their fishing tourism trip in *Pula* visit *Capo Malfitano*, the others the island of *Carloforte*. After that the lunch is served on board. Going back to the port, tourists can swim again and take part in the second demonstration of fishing, when the fisherman throws the net in the sea. One more time the fisherman explains them the technique used to do that.

The general idea in this paper, is that fishing tourism could not only improve the fish chain, but also help to develop a tourism that is more respectful to the environment. This is a sort of tourism in which the tourists are interested in keeping in touch with the landscape, knowing the original habitat and the domestic culture of the place that they are visiting. At the same time, this kind of tourist recreation allows to improve the income of the fisherman, respecting and preserving the nature. In fact, not all the fishing techniques can be used in fishing tourism, but only those that don't have a negative impact with the ecosystem where the fishing is practised.

The good results in term of additional income obtained by those who has started to diversify the fishing activity, is generating interest of the other fishermen.

3. Research method

In order to identify the elements which contribute to customer satisfaction, some fishermen which work in this field in Sardinia, has been interviewed in May 2009. In this way it has been possible understand which elements should be included in the model used in this study. Eighteen influential requirements have been individualized. These requirements are in this research method called micro categories, then these micro categories has been aggregated in a smaller number of categories (macro categories) on the base of a homogeneity criterion. In detail, five macro categories have been defined, and considering that the customers value the supply in term of the ratio between quality and price in general, but also in a specific way, this requirement has been considered twice, as a micro category first and then as a macro category (figure n.1).

In the total satisfaction analysis and in the micro categories one, has been used a semantic scale composed by seven numerical value (1, 2, 3, 4, 5, 6, 7), where one means a negative estimation (absolutely not satisfied) of the attribute in examination, while a score equal to seven shows the maximum level of satisfaction (totally satisfied).

The use of a semantic scale allows us to minimise the subjective interpretation of the valuation scale terms.

Regarding to the macro categories the interviewers gave an importance judgement and not a satisfaction one. They had 100 score to share between the different macro categories on the base of their importance, furthermore the judgement of each micro category has been weighted considering this distribution.

Figure n. 1 Diagram of the total satisfaction elements

Source: our elaboration.

The empirical analysis of the customer satisfaction has been done using a procedure with three steps. This methodology solves some cognitive and statistical problems characteristic of the customer satisfaction analysis, besides it is coherent with the model of formation of the total satisfaction used in this study.

The first step of the procedure used is finalized to the validation of the analysis model, and consists of the estimation of a multiple linear regression model, here called consistent model, where the parameters have been estimated using the OLS. In this model the dependent variable is composed by the score given to the total satisfaction, while the explanatory variables are the average score given to the different micro categories inside each of the macro categories, weighted for the weight that the tourists assigned at the same macro categories.

The consistent model can be written:

$$(1) \quad y_i = \beta^P \cdot M_i^P + \varepsilon$$

where M_i^P is a vector where each elements are the value \bar{x}_{iM}^P , and correspond to the average score gave by the i-esimo subject to the micro categories m included in the macro category M, weighted with the weight gave always by the same interviewer to the macro category M.

Therefore:

$$\bar{x}_{iM}^P = \frac{\bar{x}_{i,M} \omega_{iM}}{100}, \quad \text{with} \quad \bar{x}_{i,M} = \frac{\sum_{m=1}^M x_{i,Mm}}{N_M};$$

where $\bar{x}_{i,M}$ is the average score gave by the i-esimo subject to the micro categories m included in the macro category M, $\omega_{i,M}$ are the weights assigned by the interviewers to the different macro category, x_{iMm} are the interviewer's judgments on the micro categories. The sub scripts assume the following meaning:

i = 1,2, ... n, identified the subject interviewed;

M = 1,2,...k, identified the macro category;

m = 1,2,N_M, identified the micro categories inside the macro category M.

In the consistent model, where the total satisfaction (y), is put in relation to the independent variables drawn on the macro category, the vector β^P included the coefficients to estimate for each of the model explanatory variables and the apex element P recalls the attention that all the variable are weighted for the weight (ω) assigned to the macro category by each interviewer.

If all macro categories are statistically significant, it will be confirmed that all the tourist gave answers definitely coherent, arriving to the validation of the model regarding the total satisfaction defined ex ante.

The weights play an important role in the verification of the global satisfaction model.

Moreover, the consist model, thanks to the weight given by the interviewers to the macro categories, allows us to define the importance of each macro categories in the formation of total satisfaction.

The macro categories that present a higher coefficient are those that, in the sample analyzed, result in average more relevant in the formation of the total satisfaction judgment.

This information is very important and it is possible because the evaluate of the model has been done through the OLS method in spite of the dependent variable being an ordinal variable.

This methodological choice is driven by the instrumentality of the consistent model, which doesn't have scope of prediction but only of evaluation of the model of the formation of the total satisfaction and knowledge of the weight of the different macro categories.

The other steps, that can be estimated only after knowing the effectiveness of the consistent model, disclose the elements of the supply that are important for the tourists in the determination of the total satisfaction and their contribution to the satisfaction judgment.

These aspects have been obtained through the application of two ordered probit models, called the macro category model and the micro category model, respectively.

In the second and third step, considering the ordinal nature of the dependent variable, an ordered probit model has been used because these models seem to be those that better interpret and predict the event considered.

The second phase of the analysis puts the total satisfaction in relation with the average scores obtained by the single macro categories, this time not weighted (eq. 2):

$$(2) \quad y_i = \beta^M M_i + \varepsilon$$

where M is a vector composed by the elements \bar{x}_{iM} before defined.

The second phase takes to select the macro categories that contribute to the formation of the tourists judgment; these are those macro categories for which the coefficients inside the vector β^M are significant.

In the third phase the micro category model has been applied, that allows to identify the specific requirements of the supply which can be considered real influent in the formation of the satisfaction judgment.

In this model the explanatory variables are all judgment given by the interviewers on each of the attributes (micro categories) included in the macro categories and resulted statistically significant in the second step of the analysis.

The formal structure of the micro categories model is (eq. 3):

$$(3) \quad y_i = \beta^m X_i + \varepsilon$$

where the vector X_i contains the value assigned by the i -esimo tourist at the only micro categories that have to keep in consideration.

The third step takes to select the micro categories that contribute to the formation of the tourist judgment, they are those that inside the vector β^m presents a significant coefficient.

The application of the macro categories model represents a phase filter. This step is very important. In fact, applying the micro categories model only at the attributes included in the macro categories gave statistically significant results. In this way it is possible to concentrate the attention on the micro categories that influence in a sensitive way the total satisfaction.

4. The survey and the data

The data used to analyze the tourist preferences in this research has been collected from July 2009 to the beginning of September 2009 in the Southern part of Sardinia, as said before, in two touristic villages close to Cagliari where there are several fish firms that have started fishing tourism in addition to their main activity.

Keeping in mind that the people which we interviewed were on holiday, we tried to make the questionnaire as short as possible, but at the same time including in it all the elements indispensable to achieve our goal. The questionnaire is composed by two sections. The first part, which represents also the core of the questionnaire, includes questions addressed to know the tourists level of satisfaction regarding the service offered, asking them to give a judgment about the total satisfaction of the trip done and their

judgment for each of the micro categories, on the base of the figure n.1. All these judgments are expressed using a numerical rank shown in the third paragraph. At the end of this first section the tourists were asked to give a weight to the four macro categories. Three questions that came before this section addressed to investigate if it was the first time that tourists practised fishing tourism and the way through which they knew the opportunity to do this activity in Pula or Sant'Antioco.

In the second section there are questions useful to obtain socio-demographic information about the interviewees, and their holiday habits in terms of destination and time chosen to be on holiday, and the way used to arrange it. The tourists filled out the questionnaire at the end of the trip, when they were coming back to the port.

Because of the bad weather the summer 2009 was very short, which have had a negative impact on the research, in term of interviewees number. In fact the adverse condition of the sea didn't allow the boats involved in the study to leave the port for many days. This is an element not negligible, especially if the legal³ dimension of the ship used in fishing tourism is taken into account.

On the base of the answers received from the tourists interviewed (132), for most of them (82%) the trip done in Sardinia represents their first experience in fishing tourism.

They know about the opportunity to do this kind of tourism recreation in this Mediterranean area in different ways. Somebody have got a friend that in the past season or in the summer 2009 has done this sort of tourism recreation activity and he suggested him/her to do this experience of fishing. Others read about that in the advertisements and somebody again had been adviced in the hotel, directly from the hotel workers or reading about the activity in the reception of the hotel.

Generally speaking, tourists interviewed prefer to go on holiday in a domestic destination. Among sea, mountain, lake and art city most of them choose to spend their holiday on the sea, taking from 15 days to one month off. The 40.35% states to arrange their holiday by themselves, again the 26.32% decides where and when go on holiday looking for Internet tourist offers.

They live in family composed in average by three persons. This element is a little bit different in the sample, between people who did fishing tourism in Pula or Sant'Antioco. In fact in the first village, there are a higher number of families compared to the second one, where the sample seems to be made by a larger number of young people⁴.

³ The law states that a ship can't go over a capacity of twelve people to be considered a fishing tourism vessel.

⁴ The average age of people that have done fishing tourism in Pula is equal to 42, while 37 years is the average age of people which took part at this tourism recreation in Sant'Antioco.

5. Results

The interviewees seem to be satisfied with the experience of fishing tourism done in Sardinia. The average score given by the tourists at the variable “total satisfaction” is equal to 6.72.

Following the methodology analysis shown in the third paragraph, first of all it has been evaluated a linear regression model, called in this study consistent model and its equation is:

$$TS = \beta_{TBC}^P \cdot TBC + \beta_{SC}^P \cdot SC + \beta_{AT}^P \cdot AT + \beta_L^P \cdot L + \beta_{RQP}^P \cdot RQP + \varepsilon$$

Where TS means total satisfaction and it is the dependent variable of the model; TBC represents the group of variables related to the macro category touristic box composition; SC includes the variables group of the macro category service characteristics, AT represents the group of variables that make the macro category activity done, L included all the variables present in the macro category lunch and RQP is the interviewers judgement regard the ratio quality price. Table n. 1 shows the result of the model.

Table 1. Consistent model

Source: our elaboration.

All the variables are statistically significant, so the consistent model can be accepted. The validation of the model has also been confirmed by the non-significative of the likelihood ratio test on the omitted variables (Davidson and MacKinnon, 1993). Considering the value assumed by the coefficients, the macro categories lunch and touristic box composition seem to be more important compared to the other macro categories: ratio quality price, service characteristic and activity done.

Using the ordered probit approach the other two models have been estimated.

The variable total judgment, which represents the order dependent variable, has been put in relation before with the average score of the single macro categories and then with the score given to each of the micro categories.

The results obtained through the application of this first model are reported in table n2.

Table n. 2 Macro categories model

Source: our elaboration.

This model, which allows us to define the macro categories that influence the judgment given by the tourists regarding the fishing tourism in a

significant way, put in evidence that the macro categories “Service characteristics and Lunch” are those that influence the judgement and explain the level of total satisfaction. In detail, the sign of the coefficient shows that the satisfaction of the tourists is positively influenced by the Service characteristics and Lunch.

Defined the macro categories model, the statistical research followed with the identification of the single attribute of the fishing tourism supply which appear relevant.

The dependent variable is one more time the total satisfaction and the explanatory variable are, in this second ordered probit model, the judgment given by the interviewees at the micro categories related to the macro categories included in the preview model (tab. n. 2).

The results of the application of this second model are reported in table 3.

Table n. 3 Micro categories model

Source: our elaboration.

Inside the macro category Service characteristics, the variable which have influenced in positive way the judgement of the tourist are: Competence and Facility boat. Respectively, in term of satisfaction concerning the fisherman’s competence in fishing tourism activity and comfort of the boat used to do the trip.

Beverage is the only significant micro category included in the macro category lunch.

5 Final remarks

The study done shows as the environment and fish chain sustainability can be guaranteed by people who works in the fishing sector, through the practise of new recreation activities like fishing tourism. This last is able to increase the touristic demand giving at the fishing activity its multifunctional dimension.

The application of the customer satisfaction analysis allowed to identify and understand the level of customers’ satisfaction, involved in the research, with respect to the fishing tourism. The results obtained put in evidence the presence of a latent satisfaction that should be transformed in real satisfaction. To do that, it is indispensable to work in two directions. First of all, the fishermen have to take care of the supply elements less appreciated by the tourists, trying to improve them. Then, it is indispensable to sensitize the tourists to respect the environment more. In this way the relationship between fishing tourism firms and people should become really solid and able to draw favour condition for a good performance of the fish chain.

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Tables

Table 1. Consistent model

Variable	β	t-Statistic
Touristic box composition	1.17	8.48
Service characteristics	0.92	8.21
Activity done	0.99	4.02
Lunch	1.26	7.77
Ratio quality price	0.61	2.64

Table n. 2 Macro categories model

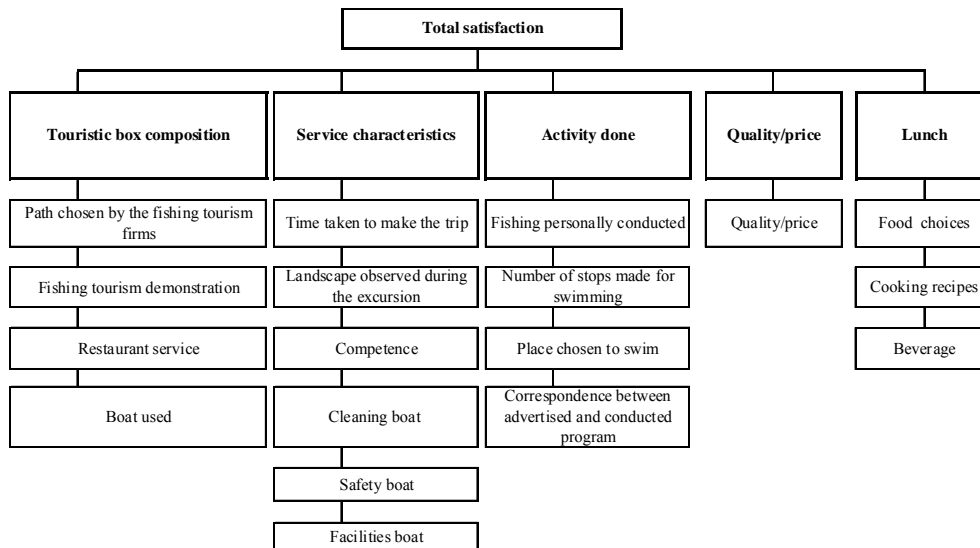
Variable	β	z-Statistic
Service characteristics	0.91	2.02
Lunch	0.73	2.00

Table n. 3 Micro categories model

Variable	β	z-Statistic
Competence	0.56	2.28
Facility boat	0.43	2.43
Beverage	0.73	3.31

Graphs and Diagrams

Figure n. 1 Diagram of the total satisfaction elements



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